OBSERVATIONS AT HONOLULU, REPUBLIC OF HAWAII.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, a copy of the daily record at Honolulu is communicated to the Weather Bureau in advance of its official publication, and is herewith printed, as a special contribution, for the convenience of those who are studying the relations of the storms and weather of the United States to those of adjacent countries, with a view to long-range, seasonal predictions.

Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, —0.06, is still to be applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10. Two directions of wind, or values of wind force, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

JULY, 1897.

July, 1897.	Pressure at sea level. 6 a. m.	Pressure at sea level. 3 p. m.	Pressure at sea level. 9 p. m.	Temperature. 6 a. m.	Temperature. 2 p. m.	Temperature. 9 p. m.	Temperature. Maximum.	Temperature. Minimum.	Relative humidity. 6 a. m.	Relative humidity. 2 p. m.	Relative humidity. 9 p.m.	Wind. Direction.	Wind. Force.	Cloudiness.	Rain measured at 6 a. m.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%	%				*Ins*
1.	30.08	30.00	30.03	76	80	76	86	75	63	61	74	e-ene.	3	4	0.00
2.	30.06	29.98	29.99	71	79	76	83	71	91	68	70	ene.	3	7	0.08
3.	30.02	29.97	30.04	74	79	76	84	73	74	64	70	ene.	4	6	0.07
4.	30.05	29.97	30.02	74	81	76	85	74	70	61	70	ene.	3	3	0.02
5.	30.07	30.01	30.07	75	81	77	86	75	74	68	74	ene.	3	5	0.00
6.	30.09	30.06	30.11	75	77	75	82	75	67	74	74	ene-ne.	3-4	10	0 02
7.	30.08	30.07	30.11	75	81	75	84	74	66	65	74	ene.	3	3	0.04
8.	30.10	30.02	30.08	73	80	73	82	70	82	61	82	ene.	4-3	2-5	0.17
9.	30.11	30.01	30.07	74	80	74	81	69	70	61	78	ene.	2	3-8	0.25
10.	30.09	30.02	30.10	75	80	75	84	73	66	57	74	ene.	3	4	0.05
11.	30.08	30.03	30.11	74	80	75	85	72	66	57	74	ene.	3	4	0.00
12.	30.09	30.04	30.08	75	82	75	84	73	74	55	74	ene.	2	3	0.01
13.	30.12	30.05	30.09	75	82	76	85	73	74	62	70	ene.	2-4	4	0.03
14.	30.16	30.05	30.07	74	80	75	83	72	74	61	70	ene.	3	8-4	0.00
15.	30.14	30.05	30.08	74	80	76	81	72	74	61	66	ene.	3	7	0.06
16.	30.07	30.03	30.05	71	80	72	82	68	86	61	86	ene.	4-2	4	0.08
17.	30.05	30.02	30.09	72	82	75	84	68	74	58	74	ne-ene.	2	6	0.07
18.	30.04	30.04	30.11	74	81	77	85	72	71	61	78	ne.	2	4-6	0.03
19.	30.08	30.01	30.08	73	80	77	82	72	74	65	71	ene.	3	6	0.05
20.	30.08	30.02	30.07	73	81	76	83	73	91	61	70	ene.	4	7	0.04
21.	30.04	30.02	30.05	74	82	76	82	73	66	55	70	ne.	2	3	0.05
22.	30.03	29.99	30.05	75	83	73	85	73	70	69	82	ene-nne.	3	5	0.02
23.	30.05	30.01	30.07	74	81	78	85	73	70	61	67	ene.	2	4	0.01
24.	30.09	30.04	30.11	75	81	77	84	73	67	61	74	ne.	3	7	0.03
25.	30.13	30.02	30.07	75	82	76	86	74	67	62	82	ene.	2	7	0.00
26.	30.12	29.99	30.07	75	82	77	84	73	79	62	67	ne.	2-4	3	0.02
27.	30.12	29.98	30.06	75	82	76	85	73	74	48	66	ene.	3	4	0.00
28.	30.04	30.02	30.08	76	82	76	85	74	70	55	70	ne.	2	5-10	0.00
29.	30.02	30.04	30.10	75	80	73	84	73	74	61	82	ene.	2	6	0.00
30.	30.04	30.08	30.09	74	82	76	86	72	70	58	74	ne.	2	3	0.01
31.	30.07	30.11	30.00	75	83	77	86	73	71	55	71	nne.	2	4-9	0.00
	30.08	30.02	30.07	74.2	80.8	75.5	83.9	72.5	72.9	60.9	73.5	ene.	3	5	1.21

Mean temperature: 6+2+9+3 is 76.8°; extreme temperatures 86° and 68°.

NOVEMBER, 1897.

1.	30.05	30.01	30.07	70	81	74	83	66	81	58	78	ene.	1	4	0.01
2.	30.05	30.05	30.08	71	79	76	81	69	78	64	70	nne-ene.	3	6	0.32
3.	30.09	30.02	30.08	69	75	76	77	65	72	74	70	ene.	5	10	0.24
4.	30.08	30.06	30.09	73	77	76	80	70	69	71	74	ne.	4	6	0.01
5.	30.10	30.01	30.03	74	78	76	82	72	78	67	70	ne.	3	9	0.01
6.	30.09	30.05	30.12	75	78	75	81	74	70	67	74	ne.	4	7	0.00
7.	30.10	30.05	30.14	74	79	75	82	74	70	68	78	ne.	3-4	7	0.01
8.	30.10	30.04	30.08	73	77	75	81	72	70	74	66	ene.	3-4	8	0.01
9.	30.06	30.02	30.08	75	79	75	82	74	70	60	70	ene.	4	8	0.02
10.	30.02	29.95	30.00	74	79	73	82	73	66	60	78	ene.	3	8	0.00
11.	30.06	29.89	29.99	69	77	73	82	66	62	67	73	ene.	1	7	0.05
12.	29.97	29.95	30.01	70	79	70	82	65	86	68	90	ene.	1	4	0.00
13.	30.03	30.02	30.07	70	79	69	83	66	86	68	86	s.	1	4	0.01
14.	30.03	30.00	30.03	69	80	70	83	65	77	72	81	sw.	2	2	0.00
15.	30.00	29.91	29.96	70	77	72	81	67	62	83	77	sw.	1	8	0.00
16.	29.94	29.89	29.94	68	76	69	79	63	76	70	81	sw.	1	6	0.00
17.	29.90	29.86	29.91	72	80	77	81	67	86	72	87	sw.	2	8	0.00
18.	29.96	29.91	30.01	70	77	71	80	67	90	67	98	ese.	1	7-10	0.25
19.	29.92	29.87	29.95	68	73	70	76	66	90	69	81	ene.	3	10	1.09
20.	29 93	29.90	29.95	70	75	70	78	69	72	74	72	ene.	2	7	0.04
21.	29.90	29.88	29.96	62	76	67	79	61	79	66	85	ene.	1	5	0.00
22.	29.97	29.90	29.99	64	74	71	78	62	85	70	68	ne.	2	4	0.00
23.	30.00	29.93	30.01	69	77	70	79	68	59	52	64	ene.	1	1	0.00
24.	29.97	29.90	29.96	61	77	68	79	59	80	70	85	ene-s.	1	1-5	0.00
25.	29.93	29.89	29.94	65	77	68	80	63	75	71	85	ene.	1	5	0.00
26.	29.99	29.95	30.03	62	76	66	79	60	74	63	80	sw.	1	2	0.00
27.	30.04	30.02	30.04	64	77	68	80	63	81	82	81	sw.	1	1	0.00
28.	30.01	30.01	30.07	65	80	69	83	63	70	64	81	sw.	1	4	0.00
29.	30.09	30.03	30.07	67	79	76	83	64	66	60	63	ene.	1	7	0.00
30.	30.09	30.03	30.07	68	78	69	81	65	81	56	86	s.	1	2	0.00
	30.01	29.96	30.02	69.6	77.5	71.8	80.5	66.6	75.4	67.6	76.1	ene-sw.	2	6	2.07

Mean temperature: 6+2+9+3 is 73.0; extreme temperatures, 83° and 59°.

Meteorological observations at Honolulu—Continued.

DECEMBER, 1897.

December, 1897.	Pressure at sea level. 6 a. m.	Pressure at sea level. 3 p. m.	Pressure at sea level. 9 p. m.	Temperature. 6 a. m.	Temperature. 2 p. m.	Temperature. 9 p. m.	Temperature. Maximum.	Temperature. Minimum.	Relative humidity. 6 a. m.	Relative humidity. 2 p. m.	Relative humidity. 9 p.m.	Wind. Direction.	Wind. Force.	Cloudiness.	Rain measured at 6 a. m.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%	%				*Ins.*
1.	30.01	29.96	30.00	70	78	72	81	67	82	67	86	sw.	2	9	0.00
2.	29.97	29.93	30.00	70	75	70	81	68	86	74	81	sw.	1	4	0.00
3.	30.06	30.03	30.11	68	78	68	81	66	81	67	85	sw.	1	3	0 00
4.	30.11	30.01	30.11	67	79	71	81	64	86	68	81	sw.	1	5	0.00
5.	30.13	30.05	30.13	70	80	72	82	67	77	64	77	sw.	1	1	0.01
6.	30.11	30.00	30.03	73	80	74	82	72	65	64	82	ene.	1	2	0.00
7.	30.07	30.00	30.08	69	78	74	81	68	81	67	82	ene.	1	2	0.03
8.	30.07	30.02	30.05	68	78	68	83	66	67	60	82	ne.	1	6	0.00
9.	30.07	29.96	30.06	65	78	70	81	64	75	75	90	sw.	1	4	0.00
10.	30.06	29.97	29.98	63	78	69	83	62	90	67	81	ne-sw.	2	4	0.00
11.	30.03	30.00	30.07	66	72	68	78	63	68	82	67	nnw-nne.	3	9	0.00
12.	30.08	30.04	30.06	63	70	63	74	62	64	55	71	ne.	3	5	0 01
13.	29.98	29.87	29.95	65	73	65	75	61	69	57	84	nne-ene.	3	2	0.01
14.	29.98	29.87	29.96	58	73	71	76	57	83	61	85	sw.	1	1	0.00
15.	29.91	29.85	29.92	65	72	68	79	62	80	91	86	sw.	1	10	0.00
16.	29.93	29.90	29.96	67	70	70	75	66	95	81	76	ene.	1	10	0.48
17.	29.96	29.93	29.99	62	78	73	80	60	83	49	77	ene.	1	4	0.00
18.	30.04	29.97	30.03	67	75	74	78	65	71	62	69	ene.	3	6	0.00
19.	30.06	30.01	30.01	70	78	73	78	68	77	63	74	ene.	4	5	0.02
20.	30.08	30.03	30.10	73	77	73	80	72	65	49	78	ene.	3	5	0.01
21.	30.10	30.08	30.14	71	75	73	79	69	68	62	65	ene.	2	3	0.02
22.	30.16	30.10	30.17	71	76	71	79	69	65	59	65	ene.	3	8	0 01
23.	30.17	30.10	30.14	72	76	72	78	71	73	59	77	ene.	3	4	0.00
24.	30.15	30.08	30.13	71	75	70	79	69	65	62	82	ene.	2	3	0.02
25.	30.11	30.05	30.07	70	75	70	77	69	60	74	86	ene.	2	3	0.00
26.	30.12	30.09	30.10	69	75	76	80	65	67	78	81	ene.	1	5	0.02
27.	30.13	30.09	30.18	69	74	75	78	65	86	74	78	ene.	1	6	0.05
28.	30.23	30.19	30.21	66	71	68	76	63	71	56	58	ene.	5	3	0.15
29.	30.24	30.15	30.17	67	72	68	75	66	66	57	72	ene.	4	4	0.00
30.	30.18	30.11	30.20	68	72	69	75	67	63	61	61	ene.	2	4	0.00
31.	30.12	30.09	30.15	70	74	72	77	67	68	74	58	ene.	3	8	0.00
	30.08	30.02	30.07	67.7	75.3	71.1	78.8	65.8	74.1	65.8	44.4	ene.	2	5	0.84

Mean temperature: 6+2+9+3 is 71.4°; extreme temperatures, 83° and 57°.

JANUARY, 1898.

1.	30.16	30.10	30.14	71	74	70	78	69	68	78	81	ene.	1	7	0.01
2.	30.17	30.10	30.15	69	75	72	79	66	90	62	73	ene.	2	2-6	0.10
3.	30.14	30.09	30.14	67	73	71	76	66	71	82	77	ene.	2	8	0.02
4.	30.15	30.10	30 18	67	72	68	74	66	85	73	81	ene.	3-4	10-6	1.01
5.	30.16	30.06	30.15	66	70	70	79	65	85	72	72	ene.	4	10	1.21
6.	30.17	30.08	30.12	67	69	70	74	65	85	90	81	ne.	3	7	0.31
7.	30.10	30.07	30.13	69	74	70	76	65	81	73	81	ne.	3	5	0.97
8.	30.12	30.11	20.19	64	72	70	74	63	90	77	68	ene.	3	8	1.42
9.	30.14	30.08	30.12	68	74	71	77	66	71	70	68	ene.	3	6	0.36
10.	30.11	30.05	30.10	69	72	72	76	67	72	77	73	ene.	3	3-6	0.09
11.	30.03	30.01	30.07	69	74	72	78	69	76	74	77	ene.	2	6	0.12
12.	30.03	30.00	30.07	68	77	69	79	69	76	67	81	ese.	1	8-4	0.12
13.	30.10	30.08	30.13	66	77	73	80	65	71	67	82	ene.	1	8-7	0.02
14.	30.11	30.07	30.14	71	77	72	78	70	72	71	77	ene.	2	3-8	0.00
15.	30.10	30.07	30.10	69	75	72	77	69	76	62	65	ene.	3-2	3	0.02
16.	30.07	30.04	30.11	70	72	72	78	70	72	78	77	ene.	1	5	0.00
17.	30.10	30.06	30.12	67	75	74	78	65	76	74	70	ene.	0-3	5	0.01
18.	30.11	30.04	30.10	70	73	72	77	70	68	82	69	ene.	3	5-8	0.03
19.	30.08	30.00	30.04	69	75	69	78	69	70	78	86	ene.	1	8-9	0.00
20.	30.02	29.97	30.04	67	76	73	80	66	80	78	82	ene.	1	8	0.29
21.	30.07	30.04	30.11	69	76	72	80	68	80	74	91	ene.	2	5	0.00
22.	30.12	30.07	30.14	70	76	72	80	70	81	74	77	ene.	3	5	0.01
23.	30.11	30.07	30.11	70	76	72	81	69	81	70	69	ene.	3	3	0.00
24.	30.10	30.05	30.09	69	75	71	78	69	76	78	77	ene.	3	3	0.00
25.	30.09	30.03	30.08	69	73	74	78	68	72	66	66	ene.	3	5	0.05
26.	30.09	30.04	30.13	70	74	71	81	70	81	71	86	ene.	1	5	0.00
27.	30.10	30.06	30.10	70	77	71	78	70	72	66	72	ene.	3	5	0.02
28.	30.07	30.01	30.07	70	75	70	77	70	68	61	68	ene.	3	7	0.00
29.	30.01	29.97	30.03	66	73	68	74	64	80	73	76	ene.	2	8-4	0.00
30.	29.97	29.94	30.02	66	72	68	74	64	71	72	76	ene.	1	8	0.03
31.	29.94	29.81	29.93	67	71	69	77	66	80	70	90	ene.	1	8	0.04
	30.09	30.04	30.08	68.4	74.0	71.0	77.5	67.4	76.7	72.9	76.4	ene.	2	6	6.26

Mean temperature: 6+2+9+3 is 71.1; extreme temperatures, 81° and 63°.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Mariano Bárcena, Director, and Señor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletin Mensual;* an abstract translated into English measures is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW during 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for January, 1898.

Stations.	Altitude.	Mean barometer.	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Aguas Calientes	6,119	23.94	75.7	31.5	57.6	50	0.00	s.	w.
Arteaga (Coahuila)	.....	.....	77.4	24.8	57.4	.....	0.00	.....	.....
Barousse (Coahuila)	5,414	.....	80.2	24.3	58.5	.....	0.00	.....	.....
Colima (Sem.)	.....	.....	.....	.....	73.9	.....	.....	.....	.....
Durango (Sem)	6,241	24.04	80.6	31.5	56.8	53	0.00	.....	w.
Leon	5,934	24.31	78.6	27.0	57.7	44	0.00	sw.	.....
Magdalena (Sonora)	4,948	.....	.....	.....	50.5	.....	7.56	ne.	ne.
Mazatlan (Cinaloa)	25	29.98	78.1	56.3	67.3	75	0.00	nw.	sw.
Merida (Yucatan)	50	30.05	95.4	51.4	75.2	63	0.26	ese.	se.
Mexico (Obs. Cent.)	7,472	23.08	73.9	28.4	55.0	49	0.00	e.	s.
Morelia (Seminario)	6,401	23.99	80.1	34.2	58.8	57	0.00	sw.	w.
Oaxaca	5,164	25.10	84.9	36.1	61.2	54	0.00	nw.	ne.
Puebla (Col. Cat.)	7,112	23.36	74.5	26.1	56.3	54	0.00	ne.	.....
Parros (Coahuila)	3,986	.....	76.6	38.5	66.6	.....	T.	.....	.....
Saltillo (Col. S. Juan)	5,399	24.84	79.2	26.4	61.0	46	0.00	s.	sw.
San Luis Potosi	6,202	24.16	73.8	28.4	56.8	56	0.00	sw.	w.
Silao (Guanajuato)	6,063	24.30	74.5	38.5	59.5	55	0.00	w.	w.
Torreon (Coahuila)	3,720	.....	81.1	27.5	59.2	.....	T.	.....	.....
Vaqueria	.....	.....	78.3	29.3	61.5	.....	0.00	.....	.....
Zacatecas	8,015	22.52	78.8	28.4	55.6	55	0.00	sw.	w.
Zapotlan (Seminario)	5,078	.....	84.4	39.0	63.0	53	0.00	sse.	sw

THE TORNADO OF JANUARY 12, AT FORT SMITH, ARK.

By J. J. O'DONNELL, Weather Bureau Observer.
(Dated February 21, 1898.)

From the very full notes on this tornado reported by Mr. O'Donnell, the Editor has made the following extracts:

On January 8, over the central Pacific Slope, an area of high pressure extended eastward over the southern Plateau and the Platte Valley to the Missouri River, southern Iowa, and Kansas. By the morning of the 10th a low area extended over the southern Pacific Slope, the Salt Lake, and Rio Grande valleys, and a secondary low prevailed in the neighborhood of Dodge City, Kans. The latter continued deepening, and on the morning of the 11th appeared as a storm center over southern New Mexico, inclosing the isotherms of 40 and 50, the path of movement of the center being about halfway between the inclosed isotherms. In the Northwest a low also appeared; there were thus two areas of low pressure with an intervening high. North and west winds with falling temperature prevailed on the west, but south and east winds with rising temperature on the east side, with cloudy weather and some rain. By 5 p. m. of the 11th the barometer had fallen 0.30 in front of the advancing storm center, but at Fort Smith the fall was only 0.12, and at Little Rock 0.10. The minimum at Oklahoma occurred at 5:30 p. m., and then rose until 8 p. m., but at this same time the barometer was falling rapidly at Fort Smith and at Little Rock. It is probable that the area of falling barometer either remained stationary or moved eastward, as Shreveport reports a maximum wind velocity of 36 miles at 7:55 p. m., whereas the maximum at Fort Smith, up to 8 p. m., was only 13 miles from the east. The change of wind at Oklahoma, from south to north, was probably contemporaneous with the rise in pressure, the beginning of the fall in temperature and the development of the thunderstorm. At this time, 6 p. m., the echelon movement of the clouds, with the bluish-green color, was first observed at Fort Smith; probably similar contemporaneous phenomena occurred elsewhere along the axis of the storm center. At 8 p. m. all stations in front and on the east of the storm's center or axis reported precipitation, and at many of them thunderstorms with maximum wind velocities of over 25 miles per hour, but at Fort Smith (and within 50 miles distance, so far as could be ascertained) no rain whatever had fallen. At South McAlester, Ind. T., on the Choctaw Railroad, 80 miles west-southwest of Fort Smith, rain began about 9 or 9:30 p. m., according to Judge Clayton, with lightning, which continued into the night; the air was then very sultry. About 11 p. m. the tornado cloud was observed in the air between Hartshorne and Alderson, Ind. T. (therefore 20 miles nearer Fort Smith), by persons who fled to their tornado cellars.

At Fort Smith, at 5:15 p. m., the cumulo-stratus clouds were moving rapidly from the south and southwest, mingling in the usual manner of such clouds, while the eastern horizon was obscured by stratus. Shortly after 6 p. m. these cumulo-stratus had changed somewhat in color, from dark gray to bluish-green, being inky black on the edges and but slightly mottled in the center. As the night approached the bluish-green became deeper, the inky spots became larger, the texture was more compact, the movement and direction remained the same, and there was no appearance of a funnel at that time.

At 8 p. m., while observing the clouds, the wind vane veered to the south with a jerk that almost wrenched it from its support, but immediately backed slowly to east and remained steady; the clouds were a sheet of unbroken stratus moving from the west, and seemingly lower than before.

At 9 p. m., when changing the thermograph sheet, the wind was still steady from the east; intense darkness prevailed in the west and north; some stars were to be seen in the east, showing that the sky in that quadrant was lightly obscured; not a trace of lightning anywhere.

At 9:35 p. m. the first lightning was observed, very low in the southwest horizon; it spread toward the south and the west, and by 10 p. m. reached an altitude of 50°.

At 11:10 p. m. the first thunder was heard, coming from the southwest; then, at intervals of six or seven minutes, it was repeated until the tornado struck the city. At no time was the lightning fierce nor the thunder loud; the lightning was always weak and distant, considering its quantity.

About 11:30 p. m. the lightning became more concentrated in the southwest, the flashes, radiating fan-shaped from a center in luminous beams, reaching to the zenith. Until midnight frequent sheet lightning illuminated the whole southern and western sky, exhibiting dense masses of broken cumulo-stratus clouds, meeting and uniting as they passed rapidly eastward.

As the clock was striking midnight and the office was about to be locked up, the barometer reading 28.846, actual, the wind south, not a drop of rain having fallen, the air feeling sultry and very damp, and while the book of mean pressures was being examined for comparative barometer readings, a gurgling noise was heard, like water rushing out of a bottle, followed immediately by a rumbling, such as that made by a number of heavy carriages rolling rapidly over a cobblestone pavement, and finally like a railroad train. These three noises appeared in this order of succession; each was distinctly different and clearly distinguishable from the other. This noise or roar is entirely peculiar to itself, though resembling those just mentioned, and is always recognizable as the "tornado roar." About two seconds elapsed between the first roar and the rattling and quivering of the office window by the wind and the terrific driving rain which at once forced itself in between the frame and the sash, at the top, the bottom, and the sides, and flooded the office. The book of means was laid aside and the observer went to the landing in the large skylight on the roof of the observatory, whence he saw the tornado cloud 450 feet distant to the southward, a twisted black mass of two clouds, accompanied by lightning from the upper parts of the clouds. The lightning was a continuous series of flashes of a pale yellow color; the noise of the thunder sounded like the muffled beating of a number of drums within the cloud. The clouds appeared like inverted siphons, each curved over downward from the right or left hand side of the cloud, respectively, to the center, where they came in contact with each other and twisted about one another downward to the ground, being narrowest about 40 feet from the ground and, probably, about 100 feet high.